United States Patent [19]

Dozier

[11] **4,101,153**

[45] **Jul. 18, 1978**

[54] **QUICK OPENING LOCK ASSEMBLY FOR DOORS AND METHOD**

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[22] Filed: **Jul. 29, 1977**

Related U.S. Application Data

[63] Continuation of Ser. No. 517,477, Oct. 24, 1974, abandoned.

[51] **Int. Cl.**[2] **E05C 15/02;** E05C 1/14

[52] **U.S. Cl.** **292/92;** 70/92; 292/165; 292/185; 292/336.3

[58] **Field of Search** 70/92; 292/34, 46, 92, 292/93, 165, 185, 222, 232, 336.3, 353; 74/56

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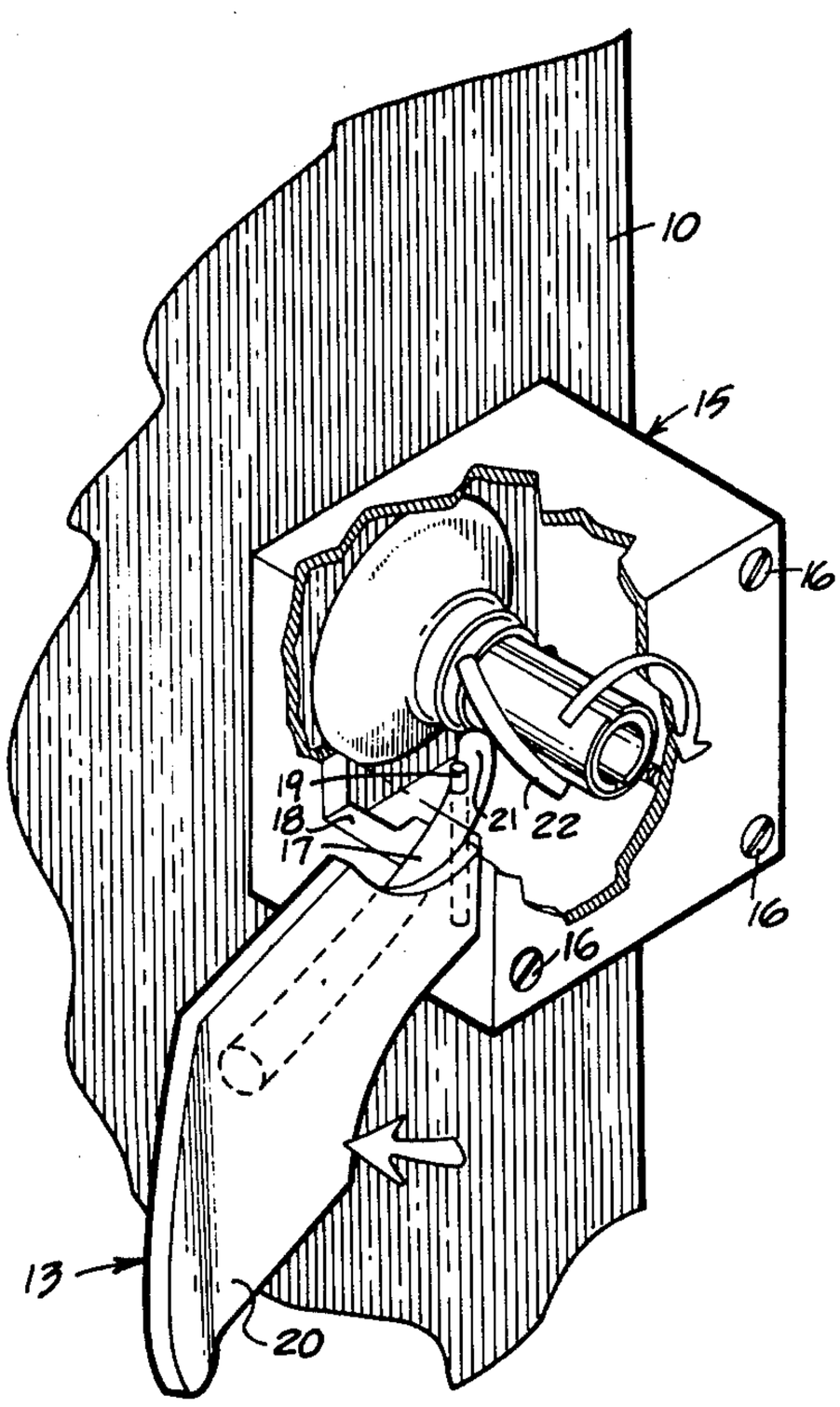
Attorney, Agent, or Firm—Phillips, Moore, Weissenberger, Lempio & Majestic

[57] **ABSTRACT**

A lock assembly is mounted on a door for opening the same upon depression of a handle pivotally mounted thereon. A spiralled cam is formed on a tubular adapter, detachably mounted on a rotary spindle of a lock assembly to replace a door knob. The handle engages the cam for retracting a latch normally extended into a striker plate for holding the door in a locked position on a door jamb, upon pivoting of the handle.

13 Claims, 6 Drawing Figures



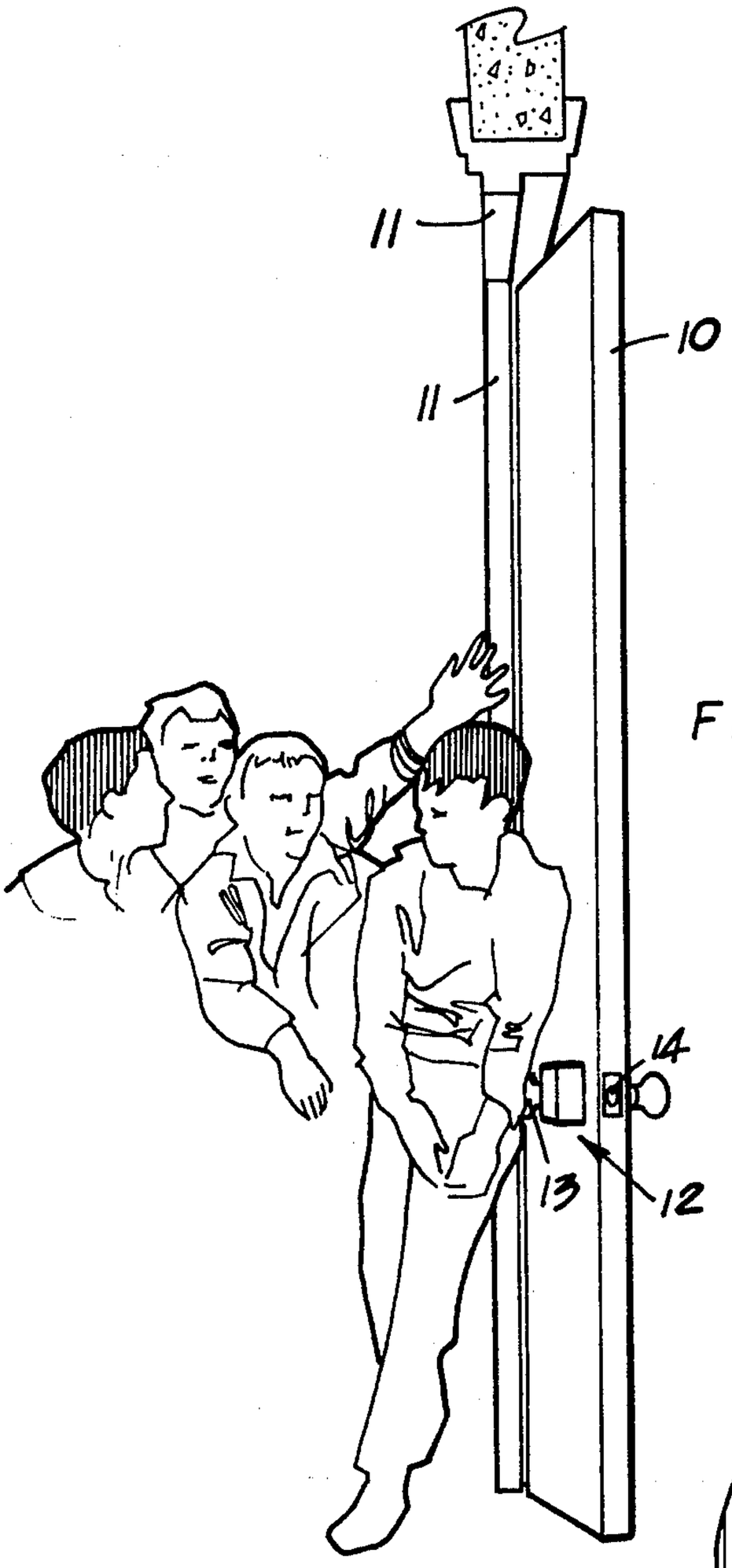


FIG. 1.

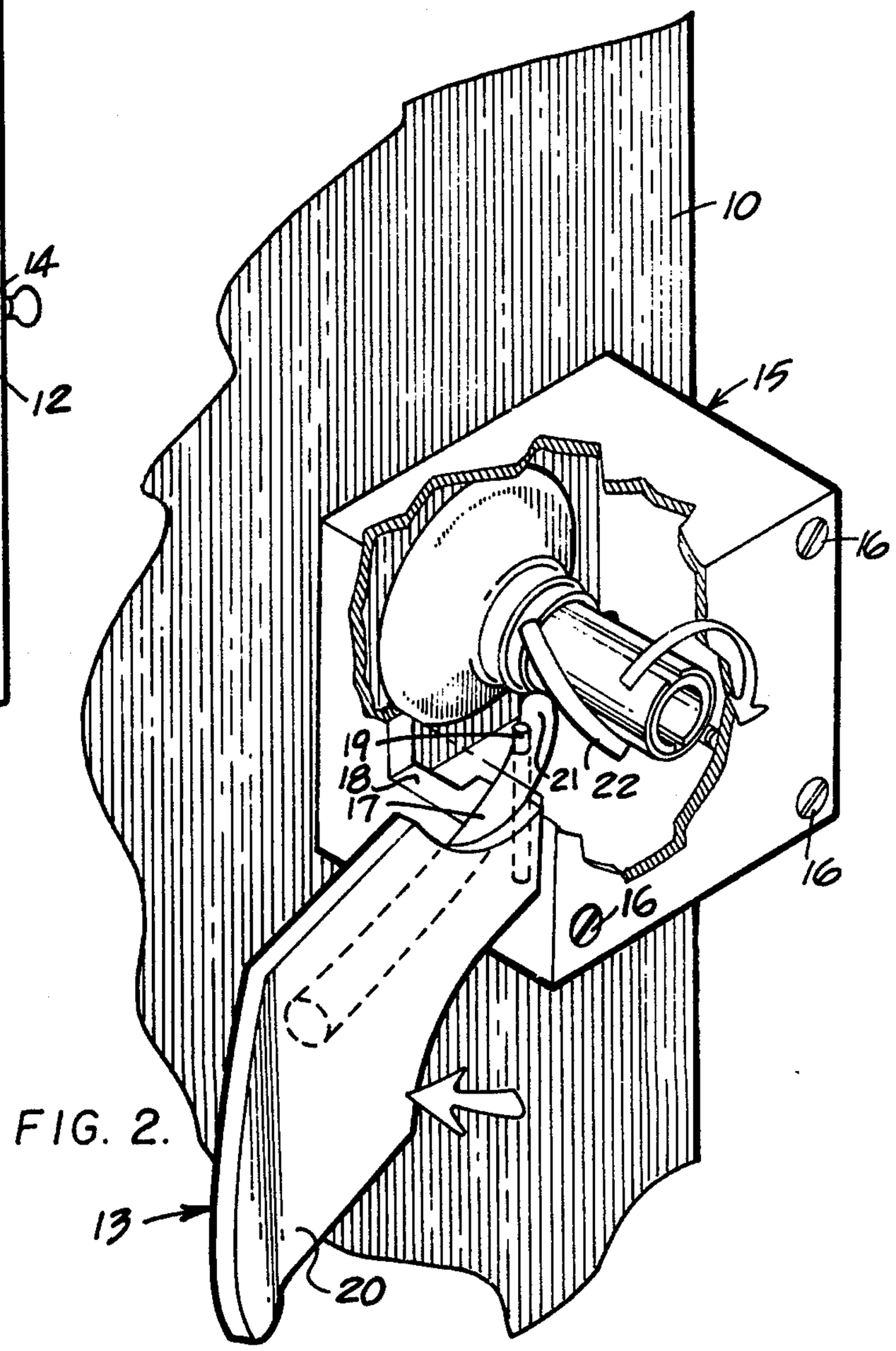


FIG. 2.

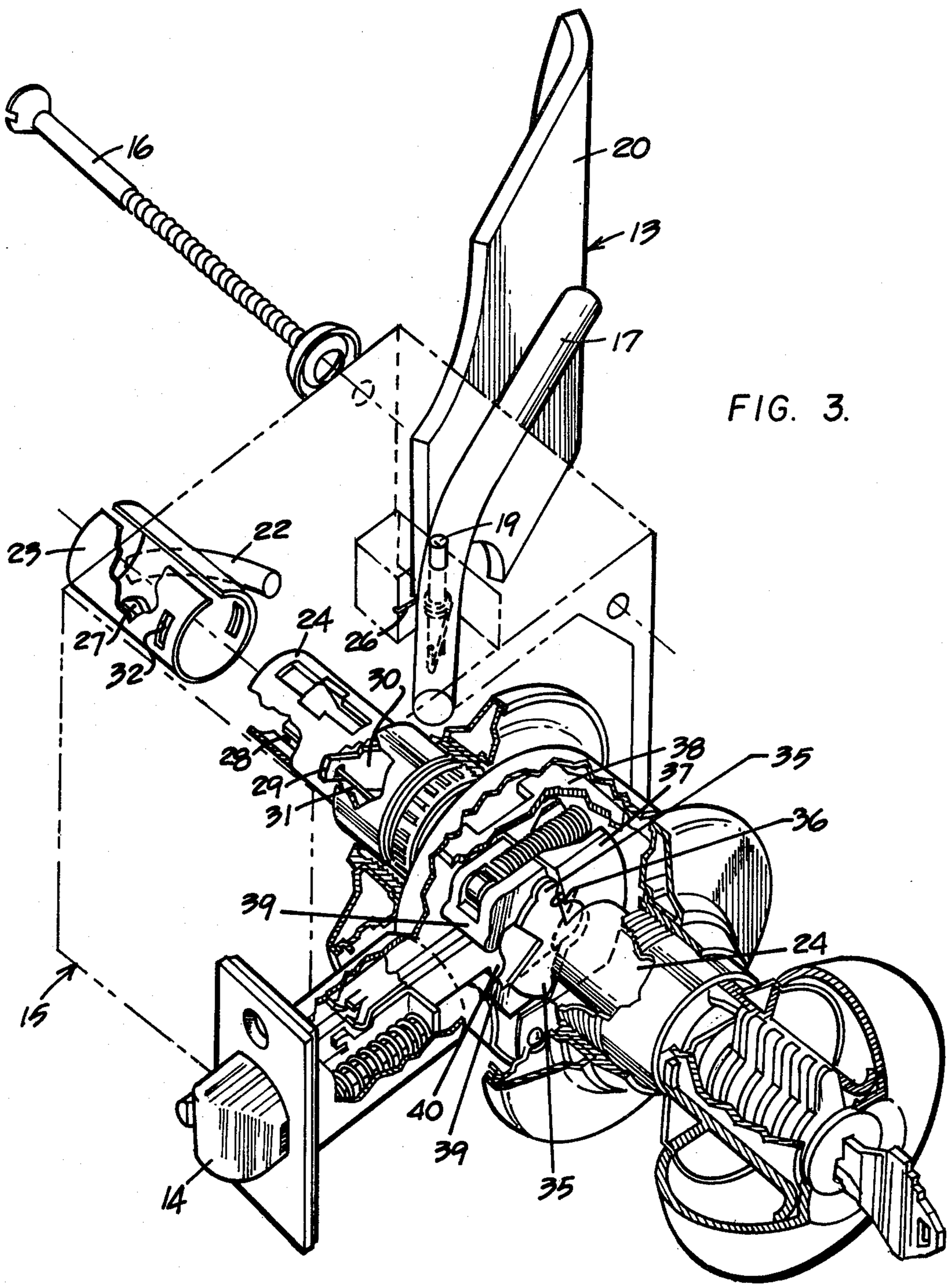

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FIG. 3.

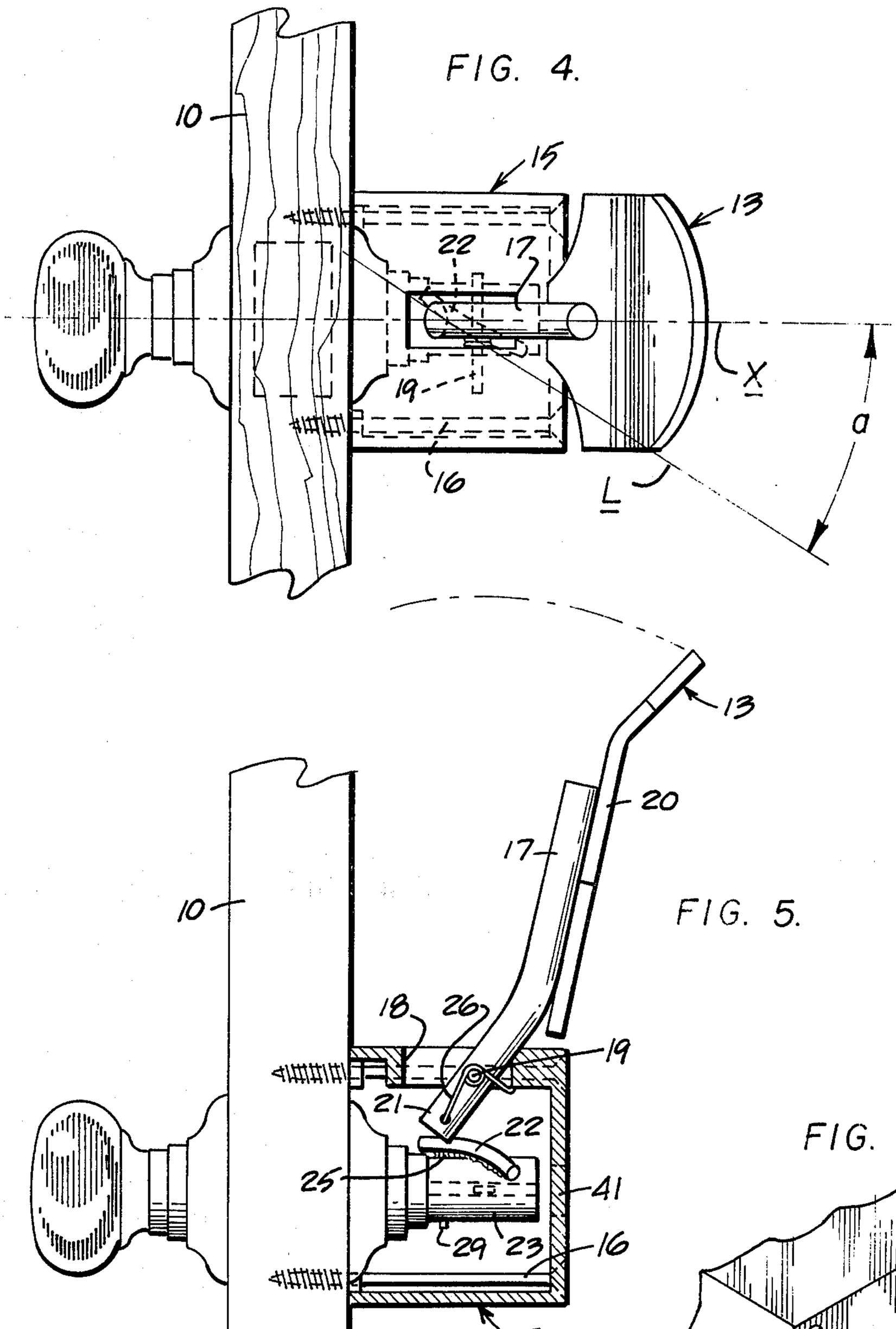
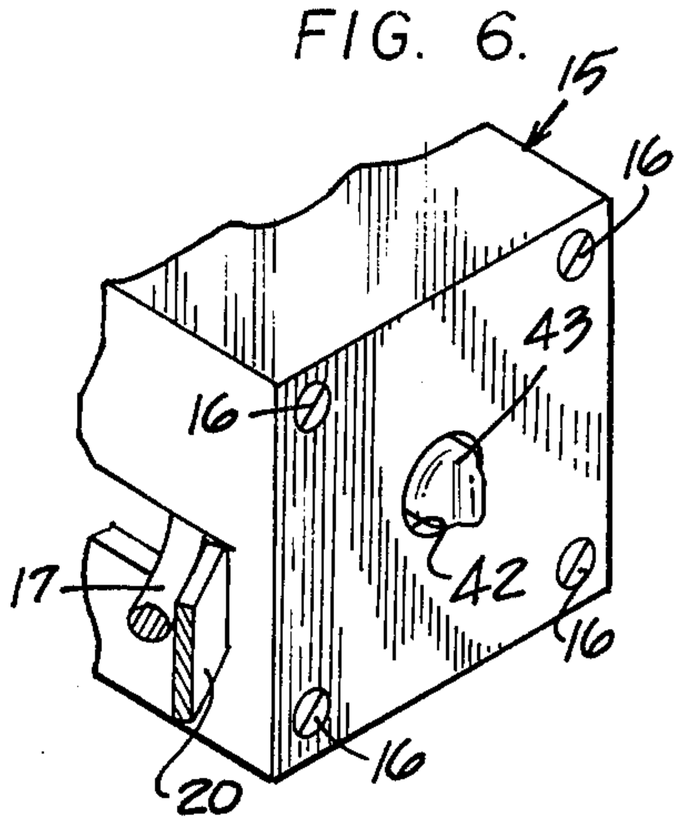


FIG. 4.

FIG. 5.

FIG. 6.



QUICK OPENING LOCK ASSEMBLY FOR DOORS AND METHOD

CROSS-REFERENCE TO RELATED APPLICATION

This application is a Continuation of U.S Pat. application Ser. No. 517,477, filed on Oct. 24, 1974 by Donald P. Dozier and now abandoned.

BACKGROUND OF THE INVENTION

Conventional door lock assemblies normally comprise a knob which is rotated to retract a latch from a striker plate. In emergency situations, such as when a crowd of children attempt to leave a room en masse in the face of impending danger such as fire, it may prove difficult to rotate the knob a sufficient amount to open the door. The State of California, for example, has enacted laws requiring the use of panic hardware on at least one door to provide expeditious egress from a public room designed to accommodate forty or more people.

Attempts have been made to construct lock assemblies of the panic hardware type to expedite the unlatching thereof in emergency situations. However, such attempts have normally resulted in complex and expensive hardware which do not always provide the desired structural integrity and capability of operating efficiently over an extended period of time. In addition, it is highly desirable to convert a standard lock assembly with reliable panic hardware economically and expeditiously.

SUMMARY OF THIS INVENTION

An object of this invention is to provide a facile, economical, non-complex and highly reliable lock assembly for a door which can be opened expeditiously by merely degressing a handle means thereof.

The lock assembly further comprises a latch unit having a latch movably mounted therein for engagement with the striker plate secured to a door jamb. An adapter, adapted to replace a door knob, comprises a tubular sleeve slidably mounted on a rotary spindle and a spiralled cam formed on the sleeve. Means are provided for detachably mounting the sleeve on the spiral to prevent rotational and axial displacement therebetween. Motion transmitting means are mechanically interconnected between the latch and the spindle for retracting the latch to its unlocked position upon depression of the handle means, movably mounted adjacent to the adapter to engage the cam thereof directly.

In the preferred embodiment of this invention, the handle means is pivotally mounted on a housing adapted to be secured to the door. In carrying forth the method steps of this invention, the adapter replaces a conventional door knob and the housing is secured to the door without having to modify the same whereby conventional lock assemblies may be converted to panic hardware economically and expeditiously.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects of this invention will become apparent from the following description and accompanying drawings wherein:

FIG. **1** illustrates a door having the quick opening lock assembly of this invention employed thereon;

FIG. **2** is an enlarged isometric view of an adapter, handle and housing employed in the lock assembly;

FIG. **3** is an enlarged, partially exploded and sectioned isometric view of the lock assembly;

FIG. **4** is a side elevational view of the lock assembly mounted on a door;

FIG. **5** is a partially sectioned view similar to FIG. **4**, but in bottom plan; and

FIG. **6** is a reduced partial view of a housing for the lock assembly, further illustrating a conventional plunger unit projecting through an aperture defined by a knock-out plug of the housing.

DETAILED DESCRIPTION

FIG. **1** illustrates a door **10** hingedly mounted in a conventional manner on a door frame **11** and normally latched to a jamb thereof (not shown) by a lock assembly **12** of this invention. This figure further illustrates an emergency situation wherein a group of school children are able to open the door expeditiously by merely leaning against a horizontally disposed handle means **13** of the lock assembly to retract a latch **14** from a striker plate (not shown) secured to such jamb. During such an emergency situation, a child could panic and forget or be unable to rotate a knob of a conventional lock assembly due to the crowding of other children behind him.

Referring to FIG. **2**, the quick opening lock assembly of this invention comprises a box-like housing **15**, preferably composed of a solid brass material, secured to one side of the door **10** by four elongated wood screws **16**. Handle means **13** comprises a bent metal stem **17** extending through an elongated aperture **18** formed through a sidewall of the housing and pivotally mounted thereon by a vertically disposed pivot pin **19**. A flared member **20** is secured on an outer end of the stem to provide an enlarged area for door opening purposes whereas an inner end **21** of the stem engages a cam means **22** formed on an adapter **23**. The adapter, rotatably mounted on the lock assembly, preferably constitutes a tubular or cylindrical sleeve, having a substantially constant wall thickness throughout the length thereof. The sleeve is slidably mounted on a spindle **24** (FIG. **3**) and releasably locked thereon to rotate therewith.

Referring to FIGS. **4** and **5**, the cam means preferably comprises a cylindrical rod which is suitably bent into a spiralled shape and brazed or otherwise suitably secured at **25** to the sleeve. The degree of spiral of the cam means on the adapter is substantially uniform throughout the length of the cam means and an imaginary line L, tangent relative to the cam means, is disposed at an angle a preferably selected from the approximate range of from 30° to 40° relative to a longitudinal and rotational axis X of the adapter (FIG. **4**). A spring means, such as torsion spring **26** mounted on pin **19**, is operatively interconnected between the stem and the housing to bias the handle outwardly away from the housing. Inner end **21** of stem **17** is thus automatically and normally positioned on an inner portion of cam means **22**, when latch **14** is in its extended locked position, upon release of the handle means.

Referring to FIG. **3**, tubular spindle **24** constitutes a component of a conventional classroom lock, such as Model D70PD manufactured by Schlage Lock Company. In essence, such a conventional lock can be modified expeditiously by the removal of one door knob and the addition of applicant's kit, comprising adapter **23**, handle **20** and housing **15**, thereto. Spindle **24** comprises a rotary input component of a conventional motion

transmitting means which converts such rotary motion of the spindle to a reciprocating motion of latch bolt **14**.

Adapter sleeve **23** is slidably mounted on spindle **24** by engaging a lug **27** of the adapter with a slot **28** formed longitudinally through a sidewall of the spindle to prevent relative rotational movement therebetween. The adapter is locked against axial movement on the spindle by means of a lug **29** formed on a member **30** disposed transversely in the spindle. Such member is urged radially outwardly by a finger spring **31** to engage lug **29** with a mating aperture **32** formed through a sidewall of the adapter.

The conventional motion transmitting means essentially comprises a pair of cam lobes **35** formed on an inboard end of spindle **24** to engage cam surfaces **36** within a U-shaped slide **37**. It should be noted that the pair of spindles **24**, disposed on opposite sides of the slide to facilitate opening of a door from either side thereof, are substantially identical to construction. Rotation of the spindle will thus function to reciprocate the spring-biased slide within a stationary member **38**. A pair of lugs **39** are formed on the end of the slide to engage enlarged end portions **40** of the latch unit to reciprocate latch bolt **14**. Further detailed description of such a conventional lock may be found in Form MS52 published by Schlage Lock Company in 1971.

In operation, depression of handle means **13** towards door **10** in FIG. **5** will pivot inner bearing end **21** thereof counterclockwise about pivot pin **19** to rotate cam **22** and adapter **23** (FIG. **2**). Referring to FIG. **3**, rotation of the adapter and spindle **24** will function to rotate a cam lobe **35** against a respective cam surface **36** to retract slide **37** to thus retract latch **14** to its unlocked position. Release of handle means **13** will permit the spring biased components of the lock assembly to return to their normal FIGS. **2–5** positions. It should be noted that housing **15** may have an annular knock-out plug **41** pre-formed thereon in axial alignment with adapter **23** to define a circular opening **42** accommodating plunger unit **43** of a conventional entrance lock or the like (FIG. **6**).

I claim:

1. A lock assembly comprising

a rotary tubular spindle,

a latch unit including a latch movably mounted therein for movement between locked and unlocked positions,

an adapter, adapted to replace a door knob, including a tubular sleeve slidably mounted on said spindle and cam means disposed in spiralled relationship on said sleeve,

means detachably mounting said sleeve on said spindle for preventing both rotational and axial displacement of said sleeve relative to said spindle,

motion transmitting means mechanically interconnected between said latch and said spindle for moving said latch to its unlocked position upon rotation of said adapter,

handle means movably mounted adjacent to said adapter and operatively engaged directly with said cam means for rotating said adapter and said spindle upon movement of said handle means, and

a housing enclosing said adapter and said spindle and wherein said handle means comprises a single stem extending through a sidewall of said housing and pivotally mounted thereon, an inner end of said stem engaging said cam means in substantial line and sliding bearing contact therewith, said means detachably mounting said sleeve on said spindle being independent of said housing and maintaining said sleeve in a fixed axial position relative to said spindle so that the inner end of said stem will be continuously and precisely maintained in bearing contact with said cam means upon pivoting of said handle means on said housing to move said latch between its locked and unlocked positions.

2. The lock assembly of claim **1** wherein said means for detachably mounting said sleeve on said spindle comprises a lug secured internally on said sleeve and slidably received within a longitudinal slot formed through a sidewall of said spindle for preventing rotational displacement of said sleeve relative to said spindle.

3. The lock assembly of claim **2** wherein said means for detachably mounting said sleeve on said spindle further comprises a lug mounted on said spindle and engaged within an aperture formed through a sidewall of said sleeve and means for biasing said lug into such engagement, said sleeve having a substantially uniform and constant wall thickness throughout the length thereof.

4. The lock assembly of claim **1** wherein the degree of spiral of said cam means of said adapter is substantially uniform throughout the length thereof and wherein an imaginary line tangent to said cam means is disposed at an angle within the approximate range of from 30° to 40° relative to a longitudinal and rotational axis of said adapter.

5. The lock assembly of claim **1** wherein said cam means comprises a bent rod of cylindrical cross section secured to said adapter.

6. The lock assembly of claim **1** wherein said handle means is horizontally disposed and further comprises a flared member secured to an outer end of said stem and disposed exteriorly of and on a side of said housing whereby horizontal pivoting of said handle means will rotate said adapter and said spindle.

7. The lock assembly of claim **1** further comprising spring means operatively interconnected between said stem and said housing for biasing said handle means outwardly away from said housing to automatically position the inner end of said stem on an inner portion of said cam means, when said latch is in its extended locked position, upon release of said handle means.

8. The lock assembly of claim **7** wherein said spring means constitutes a torsion spring mounted on a pivot pin pivotally mounting said handle means on said housing.

9. The lock assembly of claim **1** further comprising means defining an annular knock-out plug on a backside of said housing and in axial alignment with said adapter.

10. The lock assembly of claim **1** further comprising a door, said housing releasably attached to said door.

11. A method for converting a lock assembly to panic hardware, said lock assembly mounted on a door and comprising a latch unit movable between normally locked and unlocked positions relative to a door frame having said door hingedly mounted thereon, a rotary spindle, a knob detachably mounted on said spindle and motion transmitting means mechanically and interconnected between said latch unit and said spindle for moving said latch unit to its unlocked position upon rotation of said adapter, said method comprising the steps of

detaching said knob from said spindle,

attaching a tubular adapter sleeve, having a spiralled cam secured thereto, directly to said spindle to

prevent both rotational and axial movement therebetween,

securing a housing to said door to enclose said spindle, and said sleeve therein and simultaneously spacing an outer wall of said housing axially relative to an outer end of said sleeve to prevent contact therebetween;

pivotally mounting a handle on said housing and adjacent to said sleeve to engage an inner end of a single stem of said handle directly with said cam in bearing contact therewith whereby pivoting of said handle will rotate said sleeve and said spindle to move said latch unit to its unlocked position.

12. The method of claim **11** wherein said mounting step comprises pivotally mounting said handle in horizontally disposed relationship on a side of said housing.

13. The method of claim **11** further comprising the step of continuously biasing the inner end of said handle into bearing contact with said cam.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 4,101,153 Dated July 18, 1978

Inventor(s) Donald P. Dozier

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1, line 38, change "degressing" to --depressing--.

Col. 4, line 62 (claim 11), delete "and".

Col. 4, line 65 (claim 11), change "adapter" to --knob--.

Signed and Sealed this

Ninth Day of *January 1979*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

DONALD W. BANNER
Commissioner of Patents and Trademarks